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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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27313	7590	06/03/2005	EXAMINER	
MARSH FISCHMANN & BREYFOGLE, LLP			DUONG, THOI V	
3151 S. VAUGHN WAY			ART UNIT	
SUITE 411			PAPER NUMBER	
AURORA, CO 80014			2871	

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

8m

Office Action Summary	Application No. 09/591,437	Applicant(s) XUE ET AL.	
	Examiner Thoi V. Duong	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13 is/~~are~~ allowed.
- 6) ☒ Claim(s) 1-10, 12 and 14-26 is/are rejected.
- 7) ☒ Claim(s) 11 is/~~are~~ objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the Amendment filed March 17, 2005.

Accordingly, claim 11 was amended and claims 1-26 are currently pending in this application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 25 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claim contains the limitation "wherein the ferroelectric liquid crystal material in the optical device is surface stabilized" which is failed to comply with the enablement requirement. The specification discloses a SSFLC (surface-stabilized ferroelectric liquid crystal (FLC) comprising a structure free of chevron structures without a need to otherwise apply an additional treatment to the optical device. The claimed invention is not enable since the SSFLC comprising a structure free of chevron structures without a need to otherwise apply an additional treatment to the optical device is not conventional. According to USPN 6,141,076, Liu discloses an optical device having a similar structure free of chevron with the claimed invention and alignment treatment is the only

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treatment; however, Liu's disclosure directs to a non-surface-stabilized ferroelectric liquid crystal instead of surface-stabilized FLC of the claimed invention.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3-10, 14, 16-24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (USPN 6,141,076).

Re claims 1 and 14, as shown in Figs. 1 and 4, Liu discloses an optical device (as well as a method for preventing formation of chevron structures in the optical device) including a ferroelectric liquid crystal material 16, said optical device comprising:

a first substrate 10 and a second substrate 11;

a first alignment treatment applied to a surface of the first substrate, said first alignment treatment being intended to induce an orientation of at least a portion of said ferroelectric liquid crystal material along a first alignment direction 25 and with a first pretilt angle "alpha1" with respect to a plane parallel to said first substrate (Fig. 4 and col. 3, line 35 through col. 4, line 60);

a second alignment treatment applied to a surface of the second substrate, said second alignment treatment being intended to induce an orientation of at least another portion of said ferroelectric liquid crystal material along a second alignment direction 26

and with a second pretilt angle "alpha2" with respect to a plane parallel to said second substrate (Fig. 4 and col. 3, line 35 through col. 4, line 60),

wherein the first substrate is located with respect to the second substrate in such a way that the surfaces of the first and second substrates onto which the first and second alignment treatments were applied, respectively, are spaced apart, generally parallel and facing each other and a projection of the first alignment direction onto the treated surface of the first substrate makes a non-zero angle "omega" (or Liu's buffing angle) with respect to a projection of the second alignment direction onto the treated surface of the first substrate such that, said ferroelectric liquid crystal material being injected between the first and second substrates (Figs. 3A, 3B and 4; col. 4, lines 4-60).

Liu discloses a problem in Prior Art where a typical SSFLC (surface-stabilized ferroelectric liquid crystal) creates a "chevron" structure which resulted in a high transmission loss due to strong buffing when parallel rubbing is applied to the substrates (col. 1, lines 25-34 and col. 4, lines 36-46). Liu overcomes the problem by providing a ferroelectric liquid crystal structure wherein excellent contrast is obtained with weak buffing or even greater contrast provided with strong buffing (col. 4, lines 47-53). Accordingly, it is obvious that Liu creates a structure without the need to otherwise apply an additional treatment to the optical device since buffing (weak or strong) is the only treatment in the optical device of Liu et al. to overcome a chevron or a quasi-bookshelf generated in parallel alignment case in some traditional configurations. In addition, Liu et al. also discloses that the buffing angles of the substrates are at an angle, with respect to one another, of less than 90 degrees, preferably at about 45

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degrees (col. 4, lines 53-60). Accordingly, Liu also creates a cross-buffed optical device. Since the structure recited in the Liu's reference is substantially identical to that of claims 1 and 14, claimed properties or functions are presumed to be inherent (see MPEP 2112.01). Thus, the structure of Liu is inherently free of chevron.

Re claims 3 and 16, said ferroelectric liquid crystal material has a cone angle "theta", said non-zero angle "omega" has a predetermined value such that "omega" $\geq 2(\text{theta})$ and "omega" is different from 180 degrees (col. 4, lines 53-60).

Re claims 4, 17 and 21, said first and second alignment treatments are specifically chosen so as to specifically induce pretilt angles of "alpha1" and "alpha2" (Liu's angle theta 0) respectively (Fig. 4 and col. 4, lines 23-26), wherein said choosing step further includes the step of taking into consideration molecular anchoring properties of said first and second alignment treatments so as to choose first and second alignment treatments to specifically induce pretilt angles of "alpha 1" and "alpha 2", respectively, while providing strong molecular anchoring of at least portions of the ferroelectric liquid crystal material located immediately adjacent to the treated surfaces of the first and second substrates (col. 3, lines 36-45 and col. 4, lines 46-66).

Re claims 5 and 18, said first alignment treatment includes a coating of a selected alignment material, said coating being applied, cured and treated so as to specifically induce the pretilt angle of "alpha1" (col. 3, lines 31-45).

Re claims 6 and 19, said second alignment treatment includes a coating of another selected alignment material, said coating being applied, cured and treated so

as to specifically induce the pretilt angle of "alpha2" (col. 3, lines 31-45 and col. 4, lines 23-26).

Re claims 8 and 20, said first and second alignment treatments are generally identical (col. 3, lines 31-45).

Re claim 7, each of said pretilt angles is between about 3 degrees and about 7 degrees (col. 8, lines 36-44); and

Re claim 9, said first and second alignment treatments provide strong molecular anchoring of at least portions of the ferroelectric liquid crystal material located immediately adjacent to the treated surfaces of the first and second substrates (col. 4, lines 46-52).

Re claims 10 and 22, as shown in Figs. 10A and 10B, an optical device of Liu further comprises a light input 1018 directed at said optical device in such a way that the optical device in turn produces a light output of a particular optical state; and means 1022 for electrically addressing said optical device in such a way that the particular optical state of the light output is continuously variable between a minimum optical state (V-) and a maximum optical state (V+).

Re claims 23 and 24, Liu discloses that the first and second pretilt angles are non-zero (col. 4, lines 23-26 and col. 8, lines 42-44).

Re claim 26, Liu discloses an optical device comprising all limitations of claim 1, wherein the first and second substrates are spaced apart by a distance sufficiently small to suppress formation of helixes typically formed of the ferroelectric liquid crystal material (col. 3, lines 50-57).

6. Claims 2, 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (USPN 6,141,076) in view of Iwayama et al. (USPN 5,323,253).

Liu et al. discloses an optical device that is basically the same as that recited in claims 2, 12 and 15 except for a reflective display surface and a phase sequence of the ferroelectric liquid crystal material.

As shown in Fig. 3, Iwayama et al. discloses a ferroelectric liquid crystal device comprising a reflective display surface formed on a substrate (col. 5, lines 16-20), wherein the liquid crystal shows a phase sequence of Isotropic – Nematic - Smectic A - Smectic C* - Crystalline states (col. 5, lines 52-59).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the optical device of Liu et al. with the teaching of Iwayama et al. by forming a reflective surface for a reflective display and employing a ferroelectric liquid crystal material having a phase sequence of Isotropic – Nematic - Smectic A - Smectic C* - Crystalline states for avoiding the change in cell thickness and the occurrence of liquid crystal void (col. 5, lines 64-68).

Allowable Subject Matter

7. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims (see Reasons for Allowance below).

8. Claim 13 is allowed.

The following is an examiner's statement of reasons for allowance: none of the prior art of record fairly suggests or shows all of the limitations as claimed. Specifically,

None of the prior art of record discloses, in combination with other limitations as claimed, an optical device including a ferroelectric liquid crystal material having free of chevron structures without a need to otherwise apply an additional treatment to the optical device, wherein an optical retardance of the optical device remains generally constant during continuous variation of the optical state of the light output.

The most relevant reference, USPN 6,141,076 of Liu et al., fails to disclose or suggest a constant optical retardance of the optical device remained during continuous variation of the optical state of the light output. As shown in Figs. 10A and 10B, the Liu et al.'s reference only discloses that the particular optical state of the light output is continuously variable between a minimum optical state (V-) and a maximum optical state (V+) (col. 5, lines 40 through col. 6, line 12).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

9. Applicant's arguments filed March 17, 2005 have been fully considered but they are not persuasive.

Re claim 25, Applicant argued that the Examiner's rejection of claim 25 under section 112 is nonsensical. The Examiner disagrees since the Examiner has

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established a prima facie case of lack of enablement, the burden falls on the applicant to present persuasive arguments, supported by suitable proofs where necessary, that one skilled in the art would have been able to make and use the claimed invention using the disclosure as a guide. Affidavits or declarations of attacking the operability of a patent cited as a reference must rebut the presumption of operability by a preponderance of the evidence (see MPEP 716.07).

Applicant also argued that Liu does not disclose a crossed-buffed device and a ferroelectric liquid crystal material being free of chevron structures without the need to otherwise apply an additional treatment to the optical device and that the Examiner provides no support for his conclusion that excellent contrast necessarily means that a device is free of chevrons. The Examiner disagrees with the Applicant's remarks since Liu discloses a problem in Prior Art where a typical SSFLC (surface-stabilized ferroelectric liquid crystal) creates a "chevron" structure which resulted in a high transmission loss due to strong buffing when parallel rubbing is applied to the substrates (col. 1, lines 25-34 and col. 4, lines 36-46). Liu then overcomes the problem by providing a ferroelectric liquid crystal structure wherein excellent contrast is obtained with weak buffing or even greater contrast provided with strong buffing (col. 4, lines 47-53). Accordingly, it is obvious that Liu creates a structure without the need to otherwise apply an additional treatment to the optical device since buffing (weak or strong) is the only treatment in the optical device of Liu et al. to overcome a chevron or a quasi-bookshelf generated in parallel alignment case in some traditional configurations. In addition, Liu also discloses that the buffing angles of the substrates are at an angle, with

respect to one another, of less than 90 degrees, preferably at about 45 degrees (col. 4, lines 53-60). Accordingly, Liu also creates a cross-buffed optical device. Finally, since the structure recited in the Liu's reference is substantially identical to that of claims 1 and 14, claimed properties or functions are presumed to be inherent (see MPEP 2112.01). Thus, the structure of Liu is inherently free of chevron and a prima facie case of either anticipation or obviousness has been established.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (571) 272-2293.

Thoi Duong



05/20/2005



ROBERT H. KIM
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